

L1 437 5AT OR AMINOTETRAZOLE# OR AMINO (W) TETRAZOLE#
L2 48 L1 (P) FUEL
L3 3 L2 AND AUTOIGNITION

1. 5,765,866, Jun. 16, 1998, Airbag inflator employing gas generating compositions containing mica;
2. 5,739,460, Apr. 14, 1998, Method of safely initiating combustion of a gas generant composition
3. 5,431,103, Jul. 11, 1995, Gas generant compositions; Christopher Hock, et al., 102/289; 86/1.1; 102/290; 280/741

US PAT NO: 5,431,103 L3: 3 of 3

ABSTRACT: A . . . metal oxide, such as CuO. Generant compositions in accordance with the invention autoignite in a range around 170.degree. C., providing **autoignition** of the generant

DETD(3) While the major **fuel** component may be selected from any of the tetrazole and triazole compounds listed above and mixtures thereof, from an availability and cost standpoint, 5-**aminotetrazole** (AT) is presently the azole compound of choice, and the invention will be described herein primarily in reference to AT. The purpose of the **fuel** is to produce carbon dioxide, water and nitrogen gases when burned with an appropriate oxidizer or oxidizer combination.

DETD(27)	1	2	3
Guanidine nitrate	9.84	10.84	11.82 Soluble **Fuel**
Cupric oxide	70.94	70.48	70.03 Oxidizer
5-**Aminotetrazole**	17.73	17.20	16.67 **Fuel**
Sodium nitrate	1.48	1.48	1.48 Oxidizer (low ignition temperature) . . .

L4 9 L2 AND NONAZIDE
L5 9 L4 NOT L3
=> set hig off SET COMMAND COMPLETED
L6 9 L4 NOT L3
=> set hig on SET COMMAND COMPLETED
L7 9 L6 AND L2

4. 5,531,941, Jul. 2, 1996, Process for preparing azide-free gas generant composition; Donald R. Poole, 264/3.4; 149/47, 109.6

5. 5,514,230, May 7, 1996, Nonazide gas generating compositions with a built-in catalyst; Paresh S. Khandhadia, 149/36, 61, 77

6. 5,460,668, Oct. 24, 1995, Nonazide gas generating compositions with reduced toxicity upon combustion; Lyman R. Lyon, 149/36, 61

7. 5,386,775, Feb. 7, 1995, Azide-free gas generant compositions and processes; Donald R. Poole, et al., 102/289, 290; 149/36

8. 5,139,588, Aug. 18, 1992, Composition for controlling oxides of nitrogen; Donald R. Poole, 149/61, 77, 83

9. 5,035,757, Jul. 30, 1991, Azide-free gas generant composition with easily filterable combustion products; Donald R. Poole, 149/46, 45, 61, 70, 75, 76, 77, 83, 85

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BSUM(16) In accordance with the present invention, the **fuel** utilized in the nonazide gas generant is preferably selected from compounds that maximize the nitrogen content of the **fuel** and regulate the carbon and hydrogen content thereof to moderate values. Such fuels are typically selected from azole compounds, particularly tetrazole compounds such as **aminotetrazole**, tetrazole, 5-nitrotetrazole, 5-nitroaminotetrazole, bitetrazole, and triazole compounds such as 1,2,4-triazole-5-one or 3-nitro-1,2,4-triazole-5-one. A preferred embodiment utilizes 5-**aminotetrazole** as the **fuel** because of cost, availability and safety.

CLMS(4) 4 . . . occupant safety restraint device comprising at least one material of each of the following functional groups of materials: a. a **fuel**;
b. an oxidizer compound; c. a slag forming compound; and
d. a catalyst which promotes the conversion of toxic oxides of nitrogen and carbon monoxide to nitrogen gas (N₂) and carbon dioxide, respectively, wherein the **fuel** comprises 5-**aminotetrazole** which is present in a concentration of about 26% to about 32% by weight, . . .

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BSUM(57) a. A **fuel** selected from the group of tetrazole compounds consisting of **aminotetrazole**, tetrazole, bitetrazole and metal salts of these compounds as well as triazole compounds and metal salts of triazole compounds.

BSUM(62) The **fuel** may comprise 5-**aminotetrazole** which is present in a concentration of about 22 to about 36% by weight, where the oxygen containing oxidizer compound. . .

BSUM(63) Alternatively, the **fuel** and high-temperature slag forming material may comprise the strontium salt of 5-**aminotetrazole** which is present in a concentration of about 30 to about 50%

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BSUM(48) a. A **fuel** selected from the group of tetrazole compounds consisting of **aminotetrazole**, tetrazole, bitetrazole and metal salts of these compounds as well as triazole compounds and metal salts of triazole compounds.

BSUM(53) The **fuel** may comprise 5-**aminotetrazole** which is present in a concentration of about 22 to about 36% by weight, where the oxygen containing oxidizer compound. . .

BSUM(54) Alternatively, the **fuel** and high-temperature slag forming material may comprise the strontium salt of 5-**aminotetrazole** which is present in a concentration of about 30 to about 50% by weight, where the oxygen containing oxidizer compound. . .

CLMS(1) . . .